

CDFA FREP FULL PROPOSAL

CDFA FREP Proposal: *Training on Crop Management that Integrates Climate, Soil and Irrigation System Data to Minimize Nutrient Loss and Optimize Irrigation Efficiency*

Project Location: *Stanislaus County*

Project Duration: *Three Years*

Project Lead:

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B. Executive Summary

1. Problem

As technology in irrigation, chemigation and fertigation advance, there is an increased need to provide agricultural workers at all levels information on best management practices. The East Stanislaus Resource Conservation District (ESRCD) addresses local resource concerns through a variety of outreach programs that include irrigation and nutrient management workshops which include material on integrated management practices. Through constant contact with local producers in Stanislaus County, it has become apparent that irrigator education is a large need for those in our area. One of our leading local growers commented recently, “All of the new irrigation technology is great, but it doesn’t make a difference if the irrigator doesn’t know how often to flush the lines or check emitters.” The trainings we propose would help ensure that decision makers are using water efficiently, are able to accurately monitor nitrogen application levels and are better able to manage the health of their soil for optimum productivity while preventing deep percolation of nitrates that contaminates groundwater.

In farming, there has been a huge push to implement a wider variety of instruments to ensure available water and nutrients are monitored closely, applied precisely and used efficiently. There is a technological gap of information for the decision maker and irrigators on how to properly operate and maintain irrigation systems. Precision farming requires a better understanding on individual properties to help identify irrigation system inefficiencies, understand soil assessments, and identify additional resource concerns such as sediment and erosion issues. Individual operations would benefit from developing a comprehensive conservation plan and written evaluation on distribution uniformity, soil properties, maximum allowable depletion and scheduling to prevent stress and deep percolation of water and nutrients.

A 2015 FREP funded research project titled “Water and Nitrogen Management: Recognizing and Adapting to Logistical Challenges at the Farm Field Level” brought attention to the challenges that producers in the Central Coast region face when it comes to balancing Water and Nitrogen (N) best management practice and the production quantity and quality requirements implemented by the demands of the market. One major issue emerging from the research done by Mr. Marcus Buchanan was the lack of technical training and trained employees when it came to water and nitrogen management. Management systems are a costly investment, the promise of a reduced negative impact on the environment through more precise application of nutrients and water, combined with the potential yield benefits have taken priority connected through the precise placement of fertilizers and irrigation directly to the root zone. However, there has been one aspect of these micro-irrigation systems that is frequently left out and prevents growers from maximizing efficiency of nutrient and water application: EDUCATION.

2. Objectives, Approach, and Evaluation

The Management, Assessment and Training (MAT) program seeks to address and alleviate the knowledge gap issue in the Central Valley through: Training, Evaluation, Certification, and Outreach. Trainings will include Soil Health, Nutrient Management, Irrigation Water

Management and Irrigation Evaluation Methods. The trainings will be provided in both English and Spanish to reach operators at all levels including landowners, field managers, and crop advisors.

Our goal is to provide training on crop management that integrates climate based data, soil based data and irrigation system data to minimize nutrient loss and maintain optimum irrigation efficiency. Workshops will cover topics that help identify necessary improvements to existing irrigation systems and train on use of climate based data, soil based data, various methods, tools and software needed to create an irrigation schedule and manage nutrient application. In the maintenance portion of the workshops, irrigators will be presented with a checklist of regular maintenance items that aide in increased system efficiency and longevity. Finally, in the soil health portion of the workshop, irrigators will learn the direct correlation between routine irrigation maintenance and nutrient management. For example, we will discuss how multiple case studies have shown that a good practice for improving your soils water and nutrient holding capacity is by means of soil organic matter. Each percentage increase of soil organic matter has a significant increase to both nutrient and water holding capacity. Also, they will learn how to manage nitrogen content in the water and soil, how to track and report nitrogen usage, and general information on the safe application and disposal of fertilizers.

Project will be evaluated based on landowner and irrigator knowledge, improvements in management practices based on irrigation evaluations and conservation assessment data collected, and number of resource conservation districts in California that host irrigator workshops using materials developed under the FREP funds. Evaluation of the project will be achieved through pre and post surveys that will collect quantitative data on changes in water and nutrient management, document improvements for and qualitative data on landowners and irrigators changes in knowledge in both water and nutrient management. Additional evaluation of program can be tracked through usage of the developed conservation plans to address Irrigated Lands Regulatory Program (ILRP) requirements, apply for funding through conservation programs such as USDA-NRCS and CDFA.

The duration of this project will initially be three years providing four workshops per year for the producers at various times of the year. As the project progresses, we will build on the farmer-to-farmer education as well as partnerships to ensure continuation of the workshops. Sustainability will be a measure of success, as well as, interest from other Resource Conservation Districts in our regions and throughout the state. Contact will be made to local producers with already established connections to the ESRCD through previous programs offered to producers, local water districts and the East San Joaquin Water Quality Coalition.

3. Audience

This educational program is designed to reach landowners and irrigators in the Central Valley region with training materials on proper operation and maintenance of irrigation systems that can be used by Resource Conservation Districts throughout California. Through registering the workshops and material through the Irrigation Association, California Certified Crop Advisors and Department of Pesticide Regulation attendees will include students seeking certifications and

crop advisors looking to maintain their certification which will further the outreach to potential landowners and irrigators.

C. Justification

1. Problem

The drought in California has prompted many programs and regulations to conserve and protect our groundwater resources. Irrigation efficiency in agricultural operations is important factor in conserving water, ensuring fertilizer application accuracy and best managing our resources. New irrigation technology is often implemented as part of these efforts, converting less efficient flood irrigation to more efficient micro-irrigation systems with initial distribution uniformity as high as ninety-five percent.

An issue with an increase emphasis and directly related to irrigation efficiency is fertilizer application efficiency. As the number of agriculturalist's installing micro irrigation system increases, there is a proportionate increase in the number of producers utilizing their system to chemigate and fertigate. Chemigation and fertigation are the act of injecting chemicals and or fertilizers into the irrigation water to apply for the crop and or soil. For a chemigation or fertigation event, the irrigation system is the limiting factor, the chemical and or fertilizer can only be as efficiently applied if the system is operating efficiently. Furthermore, if a producer has a fertilizer solution it is essential that the irrigation system being used to deliver the calculated solution has a good distribution uniformity to ensure that the fertilizer is evenly applied in order to avoid the potential negative environmental effects of poorly applied fertilizer.

Some factors that greatly affect the distribution uniformity of a micro irrigation system are water quality, regular maintenance, and pressure losses. Water that is not properly filtered, is high in particulate matter, contains various algae, has the potential to plug or clog emitters which if not mitigated creates a severe decrease in the distribution uniformity of the system. When regular maintenance is neglected the emitters that are plugged in the system are not noticed, other emitters do not receive the proper cleaning expediting the wear and strain on the system, and leaks are not noticed causing pressure losses. Pressure losses can cause emitters to underperform compared to the level they were designed to perform at and the rate at which they were designed to emit. For example, a producer desires to deliver one inch of water to the crop but the system being used has a distribution uniformity of seventy percent (not uncommon for systems in the ten to fifteen year old range) there would have to be an actual average application of nearly an additional half an inch of water to ensure the field is receiving an inch of water on average with some portions of the receiving nearly two inches of water and risking deep percolation. Since the practices of chemigation and fertigation are becoming common in our region, and the cost of irrigation water and pressure generation is continuously increasing, an inefficient irrigation system requiring a producer to over apply chemicals, fertilizers, and irrigation is a serious issue. Through simple regular maintenance and testing the distribution uniformity of a producers irrigation system can be significantly increased consequently reducing the waste or misuse of agricultural chemicals, fertilizer, and the diminishing supply of irrigation water. This is where the lack of education with new irrigation technology and the ESRCD trainings will demonstrate the biggest impact.

Addressing this problem must start with education in the form of Irrigator Workshops. Understanding the full and strenuous schedule held by agricultural producers and their employees, these workshops will be offered in English and Spanish at four different times throughout the year to increase the number of growers and employees who are able to attend, taking into consideration their operational schedules. At these workshops, the producers and their employees will receive information on the concept of uniformity and the effect that has on water and nitrogen management, the importance of regular maintenance, and how to properly use the new technology that is coming into the irrigation industry.

The MAT evaluation process will provide an in-field system and site evaluation for each of the growers who choose to utilize the evaluation service. The evaluations will consist of system efficiency test to determine distribution uniformity and identify maintenance issues, a graphical soil assessments of micro and macro nutrients, and discussion about current operational practices. These evaluations will identify areas where best management practices could be fine-tuned and lead to some implementation options to increase operation efficiency. A full conservation plan will be developed based on the landowners decisions to address the most pressing water, soil and nutrient management practices that can then be used to seek additional technical assistance.

2. FREP Mission and Research Priorities

This project focuses on the FREP goal of improving input management through Irrigator Workshops increasing the level of penetration that information regarding best management practices has in local agricultural companies. In addition, the post workshop evaluations that will be available will promote the use of management practices designed to achieve higher operational efficiency, such as flow meters, soil moisture probes, tensiometers, ET based irrigation scheduling, and/or a means to measure stem potential water levels. These measures, along with others, in the comprehensive conservation assessment aspect of the evaluation will promote an increase in water and nutrient efficiency by allowing the producer and irrigator both to understand the actual available water in the plant's effective root zone. Finally, the workshop will help inform the producers and irrigators of the interconnectivity between the efficiency of their irrigation system and the affect that has on nutrient efficiency through the concept of uniformity.

Another area of the FREP goals that this program highlights is the technical education aspect. This program addresses this area three-fold, impacting the irrigators, the producers, and certification programs. The program educates the irrigators primarily through the workshops but also by catalyzing a long-lasting conversation with the landowner about the system's efficiency and uniformity as the irrigators are out in the field continually irrigating and conducting maintenance. The program educates the producers both through the workshops on water and nutrient management and in-field evaluations of water, soil and nutrient management. After a series of tests are run during the field evaluations, the grower will become aware of resource concerns on the parcel and receive a variety of options to help remedy those concerns, whether related to their irrigation system, nutrient management efficiency, or both. These workshops can

be used to satisfy certification requirements with the Irrigation Association, Certified Crop Advisor program and the Department of Pesticides.

3. Impact

The MAT program will impact local producers' environmental, economic, and agronomical levels of success both on the regional and state level. The MAT program will impact not only Stanislaus County but San Joaquin and Merced County by utilizing the networking reach of Modesto Junior College and the East San Joaquin Water Quality Coalition. On the state level, the ESRCD will present this program at the California RCD meeting, showcasing the success, participation, and problems that arise from the MAT program while encouraging other RCDs across the state to develop a similar program to reach and help meet the needs of the growers in their area of influence.

There will be a significant positive environmental impact resulting from the MAT program due to the connection being made between irrigation system uniformity and the effectiveness of nutrient application. The desired result is to provide both producers and their employees the necessary education to increase general efficiency in producer systems and nutrient application methods, minimize unintentional waste of irrigation water and nutrients applied, as well as increase the environmental health and sustainability of their operations. As a result of grower adoption of best management practice which will result in increased efficiency of the operation and minimizing waste, there will be a likely reduction of the effects that the operation has on the water quality in their area as well as a reduction in greenhouse gasses associated with the energy required to create the nutrients used, pump the irrigation water, and application.

This positive environmental impact has a direct correlation with a positive economic impact. Through working to increase the producers' soil health, irrigation system and fertilizer application efficiency, and minimizing water and nutrient waste, the amount of money spent on yearly inputs needed for crop health will significantly decrease. In addition, there will be a decrease in the amount of economic investment needed for energy cost. By improving the efficiency of both irrigation water and nutrient application, there will be a decreased amount in pumping costs, fuel costs, and the other miscellaneous costs associated with water and nutrient application.

Lastly, the MAT program will have a positive agronomic impact on the participants in the form of increasing an awareness of new technology available to both producers and employees to help increase efficiency, increase soil health and stability, monitor actual nutrient and water levels, and finally provide options to create or improve a precise schedule for nutrient and water application. The evaluations will discuss cultural practices conducted in the operation which have some room for improvement to increase the agronomic sustainability of the producers' farming operation.

4. Long Term Solutions

Through creating a sustainable program consisting of education, site specific evaluations, and suggestions on how to improve resource and nutrient efficiency, this program would lead to

immediate improvement of nutrient and water management in the local region. Publicizing and promoting the success local growers have had with this education and assessment program, could cause other counties to be encouraged to create a similar program addressing the same issues.

5. Related Research

A similar opportunity is available to some producers through the Natural Resources Conservation Service's (NRCS) Irrigation Water Management workshops. However, the IWM practice has some shortcomings that the MAT program would mitigate. The IWM workshops are only for producers who have a contracted program with the NRCS; the MAT program would be open to the public without the need for membership or contract association. The current NRCS IWM workshops require attendance by the applicant, who is not necessarily the irrigator. The education and assessment program seeks to include and educate the employees responsible for conducting the irrigations, regular system maintenance, and nutrient application. Finally, the NRCS IWM program does not offer evaluations of current systems but encourages producers to implement new, more efficient systems. The education and assessment program would offer evaluations of current irrigation systems and soil conditions that would lead to other ways to improve efficiency not limited to complete system renovation.

6. Contribution to the Knowledge Base

The MAT program would use current knowledge and research to educate local growers on the concept of uniformity as well as the effects and potential benefits that come from keeping a high uniformity in an irrigation system. Through the onsite system evaluations, there will be a newly heightened awareness of the lack of understanding amongst producers and their employees regarding the concept of uniformity and the effect that has on water and nutrient management.

7. Grower Use

There are a few fundamental incentives for growers and irrigators to participate in the MAT program. First and foremost, improving the health of the producers' land to increase the sustainability of their operations for future generations is a strong incentive in the agricultural community. Offering simple solutions to improve on resource efficiency and sustainability which could be as simple as changing cultural practices to increase regular maintenance will solidify interest in the MAT program. Secondly, the reports and plans created could help growers meet regulatory requirements under the ILRP. Finally, the potential for a significant increase in crop production, decrease in annual input costs, as well as a decrease in energy cost will be a large incentive for the local producers to explore the opportunities available through the MAT program.

In addition to these fundamental incentives, the MAT Irrigator Workshops will be registered with the County Agriculture Commissioner's Office to count for continuing education units required to maintain Pest Control Advisor, Certified Crop Advisor, and Qualified Applicator Licenses. The workshops will also be registered with the Irrigation Association to count for continuing education hours towards the requirement for Certified Agriculture Irrigation Specialist (CAIS) and through collaboration with Modesto Junior College, provide the

opportunity to attain the CAIS certification through the college. Finally, the participants who complete the workshop will receive a certification of completion for the MAT workshops, spotlighting their competency in areas of uniformity, regular maintenance, and resource efficiency.

D. Objectives

The goal of our program is to provide local, regional and statewide training on integrated water management that will take into account climate based data, soil based data and irrigation system data to minimize nutrient loss and maintain optimum irrigation efficiency.

Objective 1: Promote best management practices through workshops for agricultural workers in English and Spanish based on existing resources from University of California Cooperative Extension, USDA-Natural Resource Conservation Services, NCAT/ATTRA and CDFA-FREP.

Activity: Conduct initial evaluations on farms to determine individual needs; evaluations will include an irrigation system assessment using the Cal-Poly ITRC program, a soil health assessment using USDA-Natural Resource Conservation Service programs, and an interview of the decision maker of the property on current management and practices.

Objective 2: Establish training materials and workshops that can be approved for continuing education credits towards maintaining certifications through Irrigation Association, California Certified Crop Advisors and Department of Pesticide Regulation.

Activity: Host pre-irrigation season workshops that will present information on system planning and scheduling, general maintenance, nutrient management and monitoring methods. Workshops will be presented in English and Spanish via use of translator units for attendees.

Objective 3: Encourage irrigators to share individual challenges and successes in workshops, which will create a networking environment for ongoing farmer-to-farmer education.

Activity: Conduct in-field evaluations with agricultural workers that have signed up at workshops to provide recommendations on best management practices tailored to their needs. Continued technical assistance will be provided throughout irrigation season to the attendees of the workshops so materials can be developed to address challenges and success in post –irrigation season workshops

E. Work Plans and Methods

1. Work Plan

The MAT Program will be implemented on a local and regional scale over the three year project timeframe. ESRCD will collaborate with partners to develop materials and workshops on best management practices.

2018 Work Plan – Year 1 - The first year will focus on creating an effective delivery method and material for in-field application for landowners and irrigators.

Project Task	Completion Date	Product, Results, Measurable Outcomes
1. Receive funds for project	January 2018	N/A
2. Develop workshop materials for irrigators	February 2018	Print copy for local implementation of outreach (English and Spanish). Submit material for qualification for CEUs for CAIS, PCAs and CCAs
3. Host two workshops	March 2018	70 landowners and irrigators receive education on water and nutrient management (English and Spanish). Collect pre- and post-survey for changes in knowledge and intention for change
4. MAT evaluations	April 2018 – September 2018	Conduct 30 in-field assessments with staff, MJC students and irrigators. Collect data for chemical and physical properties, water use, energy use, and nutrient use.
5. Share Results	October 2018 – November 2018	Outreach presentation with landowners and irrigators that participated in workshops and in-field evaluations. Present results from 2018 irrigation season at CARCD and USDA-NRCS
6. Host two advanced workshops	December 2018	Combine educational material with in-field results and irrigator input for continued education.
7. Project promotion and dissemination	Ongoing	N/A

2019 Work Plan – Year 2 - The second year will make improvements to the delivery method and materials based on feedback and effectiveness. Results from previous participants will create a farmer to farmer based learning.

Project Task	Completion Date	Product, Results, Measurable Outcomes
1. Improve workshop materials for implementation	January 2019	Print copy for regional implementation of outreach (English and Spanish). Submit material for qualification for CEUs for CAIS, PCAs and CCAs
2. Certification for Agricultural Irrigation Specialist	February 2019	Promote the Modesto Junior College Irrigation Water Management course for irrigators to pursue certification and use of Irrigator Workshops as CEU's
3. Establish Inter-RCD Memorandum of Understanding for program delivery	February 2019	Agreement to deliver Irrigator Workshops in regions through Memorandum of Understanding with Resource Conservation Districts in Central Valley

4. Host one local workshop and three regional workshops	February 2019 – March 2019	135 landowners and irrigators receive education on water and nutrient management (English and Spanish). Collect pre- and post-survey for changes in knowledge and intention for change.
5. MAT evaluations	April – September 2019	Conduct 30 in-field assessments with staff, MJC students and irrigators. Collect data for chemical and biological properties, water use, energy use, and nutrient use.
6. Share Results	October – December 2019	Outreach presentation with landowners and irrigators that participated in workshops and in-field evaluations. Present results from 2019 irrigation season to partners. Program materials shared through CARCD
7. Project promotion and dissemination	Ongoing	N/A

2020 Work Plan – Year 3 - The third year will provide the opportunity to share a proven delivery method to resource conservation districts that do not currently have the resources to host educational workshops or a Mobile Irrigation Lab program.

Project Task	Completion Date	Product, Results, Measurable Outcomes
1. Host post-2019 irrigation season advanced workshop	January 2020	Combine educational material with in-field results and irrigator input for continued education.
2. Certification for Agricultural Irrigation Specialist	January 2020	Promote the Modesto Junior College Irrigation Water Management course for irrigators to pursue certification and use of Irrigator Workshops as CEU's
3. Host one local workshop and three regional workshops	February 2020 – March 2020	135 landowners and irrigators receive education on water and nutrient management (English and Spanish). Collect pre- and post-survey for changes in knowledge and intention for change
4. MAT evaluations	April – September 2020	Conduct 30 in-field assessments with staff, MJC students and irrigators. Collect data for chemical and biological properties, water use, energy use, and nutrient use.
5. Share Results	October – November 2020	Invite landowners and irrigators that participated in workshops and in-field evaluations. Present results from 2020 irrigation season at CARCD, Bay Delta Initiative, and CA Soil Health Network
6. Compile the results of project for final report	December 2020	Document changes over three year period comparing pre- and post-survey of landowner and irrigator knowledge, data

		collected through MAT evaluations, and feedback from CARCD and RCDs that have implemented workshops with materials developed
7. Project promotion and dissemination	Ongoing	N/A

2. Methods

The proposed project offers a comprehensive, multiple level approach to increasing understanding of water and nutrient management; 1) through landowner education with in-field evaluations of soil health and irrigation systems efficiency, 2) through education of irrigators with principles of maintenance and scheduling for best management of water and nutrients, as well as 3) enhancing students learning through hands-on experience.

Landowner Education: Provide in-field Management Assessment that will include a soil health assessment using 10-point approach developed by USDA NRCS, an irrigation system evaluation using Cal Poly Irrigation Training & Resource Center's program, and a review of management practices to determine any resource concerns and areas for improvement. Provide evaluation by repeating the individual evaluations on farms participating in the irrigator workshops to determine improvements.

Irrigator Education: Host two pre- and two post-irrigation season Irrigator Workshops that will present information on system planning and scheduling, general maintenance, nutrient management and monitoring methods. Workshops will be presented in English and Spanish via use of translator units for attendees. Include irrigators in management assessments during pre- and post-implementation of recommended practices.

Project dissemination: Project will be shared on a local, regional and statewide level by making workshop materials in both print and online formats. East Stanislaus Resource Conservation District will distribute hard copies at the Irrigator Workshops, Duarte Nursery Friends Day, Turlock Irrigation District annual meeting, Modesto Irrigation District annual meeting, Oakdale Irrigation District annual meeting, California Association of Resource Conservation District Annual Conference.

In addition, these materials will be submitted to the California Association of Resource Conservation Districts' online resource library hosted by the Department of Conservation. This online resource library provides resource conservation districts throughout the state access to use and implement similar projects in their regions. Many of the districts currently provide conservation planning or irrigation system evaluations, so expanding to include irrigator workshops would be achievable on a statewide scale.

3. Experimental Site

Not applicable as this is not a research project.

F. Project Management, Evaluation, and Outreach

1. Management

Trina Walley, Programs Coordinator for East Stanislaus Resource Conservation District will develop, organize and lead the daily actions of this project. Trina joined ESRCD in February 2014 to lead our Farmers Market Promotion Program grant and has been a proven leader in project implementation on countywide efforts. Trina has a background in project management and public relations through various non-profit organizations.

Jamie Meek, District Manager for East Stanislaus Resource Conservation District, will oversee the administration of the grant on project implementation progress as well as financial obligations. Jamie has extensive knowledge of the accounting and reporting required on various contracts and grants that ESRCD has held past and present.

Trina will implement the program including supervision of the interns and report to Jamie to ensure goals and objectives of the grant are met. All staff report to the ESRCD board of directors that are made up of local landowners with agricultural experience.

Project cooperator, Steve Amador, Professor of Agriculture Mechanics for Modesto Junior College Department of Agriculture, Environmental Sciences, will serve as advisor to the students conducting Irrigation System Evaluations. Modesto Junior College will be launching their Mobile Irrigation Lab program. See attached letter that details the project cooperation.

Project cooperator, Rex Dufour, Western Regional Office Director for NCAT/ATTRA, will serve as technical service provider and advisor on soil management and trainings. NCAT has many of the materials needed for the trainings along with resources to create additional materials as needed. See attached letter that details the project cooperation.

2. Evaluation

Several different methods will be used to evaluate the success of the proposed project both qualitative and quantitative.

The first approach will provide a means to improve the workshop materials throughout project delivery. The landowners and irrigators that participate in the program will be required to complete a standardized evaluation addressing level of knowledge in both water and nutrient management. These evaluations will be used directly for ongoing project improvement. Participants will also be required to complete a standardized evaluation after one year to measure changes in knowledge in both water and nutrient management. Through this evaluation method, we will be able to quantify landowner and irrigator learning and determine the effectiveness of this project. Program success will be based on number of participants (Year 1 = 70, Year 2 = 135 and Year 3 = 135) as well as changes in management practices (50% of participants adopt best management practices).

The second approach is strictly quantitative. ESRCD will collate data collected during management assessments to determine changes in chemical and physical properties, water use, energy use, and nutrient use. Results from in-field management assessments on soil health properties and irrigation system evaluations will be compared to follow-up management assessments to document any changes in chemical and physical properties, water use, energy use, and nutrient use. This data can be used to determine the effectiveness of the project based on actual implementation. Program success will be based on improvements in water management (2.5-7.4 ac inches/acre) and distribution uniformity (A 160lbs N/acre applied at 70% DU will require an additional 48 lbs N/acre to account for inefficiencies so an improvement of 10% reduces that by 16 lbs N/acre). Data will be collected from participants to calculate water savings, fertilizer savings, and acreage (Year 1 =2,600 ac, Year 2 =5,400 ac, Year 3 =5,400ac)

3. Outreach

In order to increase awareness of the project's availability and completion, ESRCD is requesting FREP funds to present the Irrigator Workshop materials in a series of workshops at local and regional trainings. These trainings are significant, because attending landowners and irrigators will receive hands-on training to incorporate the best management practices into their farming operations immediately. Attendees will be introduced to the resources available to perform management assessments during the irrigation season. After implementation at the local trainings, the ESRCD will be able to offer regional trainings to landowners and irrigators to achieve additional outreach throughout the Central Valley. As the East Stanislaus Resource Conservation District shares the improvements in water and nutrient management as a result of these workshops and management assessments, additional resource conservation districts will be motivated to organize similar programs in their region using the materials that will be made available to them through the California Association of Resource Conservation Districts.

G. Budget Narrative: 2017 FREP Proposal

a. Personnel Expenses:

Trina Walley will act as Project Lead, at 25% FTE average throughout the project over 3 years. Her calculated fringe rate is 25.7%. Projected 3-year wages and fringe is as follows:

Trina Walley, Project Leader, 25%	\$12,048.40	\$12,407.20	\$12,776.40
Trina Walley, Project Leader, 25.7%	\$3,096.43	\$3,188.65	\$3,283.53

Jamie Meek will act as Project Administrator at 10% FTE average through the project over 3 years. Her calculated fringe rate is 25.5%. Projected 3-year wages and fringe is as follows:

Jamie Meek, Project Administrator, 10%	\$5,289.40	\$5,447.52	\$5,609.76
Jamie Meek, Project Administrator, 25.5%	\$1,348.79	\$1,389.11	\$1,430.48

At the end of each school year, approximately May, we will hire three Modesto Junior College interns (one that has completed the program and two currently enrolled) to assisted project objectives through the irrigation season at 15% FTE each. The calculated fringe rate for each intern is 17% and the projected 3-year wages and fringe is as follows:

Intern 1, Irrigation Specialist, 15%	\$4,992.00	\$4,992.00	\$4,992.00
Intern 2, Irrigation Technician, 15%	\$4,056.00	\$4,056.00	\$4,056.00
Intern 3, Irrigation Technician, 15%	\$4,056.00	\$4,056.00	\$4,056.00
Intern 1, Irrigation Specialist, 17%	\$848.64	\$848.64	\$848.64
Intern 2, Irrigation Technician, 17%	\$689.52	\$689.52	\$689.52
Intern 3, Irrigation Technician, 17%	\$689.52	\$689.52	\$689.52

The total personnel costs for the project for each year is as follows:

Salary Total	\$30,441.80	\$30,958.72	\$31,490.16	
Benefits Total	\$6,672.90	\$6,805.44	\$6,941.69	
Personnel Cost	\$37,114.70	\$37,764.16	\$38,431.85	\$113,310.71

b. Operating Expenses:

Supplies (\$950.00 per year, 3 years, TOTAL: \$2,850.00)

Printed Material: This project will provide workshops at least 4 times per year, for which printed educational materials will be necessary for attendees. Approximately \$50.00 per workshop, or \$200 per year will be spent on materials for these workshops. (TOTAL: \$600.00)

MAT Reports: Participants in the evaluation portion of this project will be provided with a report in order to keep record of recommendations to improve efficiencies and to monitor progress. These reports will be prepared by East Stanislaus RCD at a cost of \$5/report. We estimate 60 reports will be completed throughout each year, at a cost of \$300 per year. (TOTAL: \$900.00)

Software: Data collection software will be necessary to compile data from evaluations and generate reports for participants. Estimate cost for data collection software is \$200 per year, renewable through subscription. (TOTAL: \$600.00)

Evaluation/Assessment Supplies: Supplies such as test strips, catch cans, plugs, etc. will be necessary to perform soil assessments and system evaluations. As these supplies are used, they will need to be replaced. We estimate approximately \$25.00 per month will be necessary each year of the project, for a total of \$300 per year. (TOTAL: \$900.00)

Equipment (TOTAL: \$0)

Travel (TOTAL: \$3,852.00)

Travel to meet with irrigators and landowners will be necessary throughout the project life. Mileage is being budgeted to allow for the occasional planning and meeting travel necessary to implement the project. We estimate approximately 500 miles per month during peak irrigation season and 100 per month the rest of year at a rate of \$0.535 per mile. Actual mileage will be expensed based on the IRS established rate at that time. Annual mileage will be budgeted at \$1,284 per year (2,400 miles/year).

Professional/Consulting Services: There will be no budget for professional/consulting services.

Other Expenses (\$46,350)

Mobile Irrigation Lab Equipment: To complete full system evaluations, rental or leasing of the Modesto Junior College's Mobile Irrigation Lab equipment will be necessary. Full costs of running the equipment is still being evaluated. However, it is estimated that rental/lease of the equipment will be approximately \$1,000 per month over the irrigation season (3 months), for a total of \$3,000 per year. (TOTAL: \$9,000)

Vehicle Rental: To conduct assessments and evaluations, transportation will be a necessity throughout the project for days that will be dedicated to the project. On average, it is estimated that there will be 10 days per month on average dedicated to this project and the workshops, evaluations and assessments, for which a truck rental will be necessary. A 4-wheel drive truck is essential to haul equipment and allow for access to areas of fields that may be wet or rough terrain. Average rental costs in this area is approximately \$75 per day. Cost is \$9,000 annually. (TOTAL: \$27,000)

Lab Analysis: Soil assessments will be completed on properties requiring lab analysis for the most comprehensive conservation plan. A Graphical Lab analysis with data on micro and macro nutrients is approximately \$75 per property (2/year), and we will complete up to 30 per year. Each year will be budgeted at \$2,250.00 per year. (TOTAL: \$6,750.00)

Equipment Service Fee: ESRCDC will provide equipment will include 2 tablets, which will require monthly service fees of approximately \$100.00 for necessary software. These will be utilized over the 3-year project plan at a cost of \$1,200 per year. (TOTAL: \$3,600.00)

TOTAL OPERATING EXPENSES: \$17,684.00 \$17,684.00 \$17,684.00 **\$53,052.00**

H. Budget Template – Attached Excel spreadsheet**I. Appendices**

1. Project Leaders Resumes (Trina Walley) – Pages 1-2
2. Cooperators (Modesto Junior College – Page 3 and NCAT/ATTRA – Page 4)
3. Supporters (California Association of Resource Conservation Districts – Page 5, East San Joaquin Water Quality Coalition – Page 6, Daniel Bays – Page 7, West Stanislaus Resource Conservation District – Page 8)